

## Claims:

1. An anchoring device for use in a pipe, the pipe including an inner diameter with an annular recess formed therein, the annular recess having a length and having a diameter greater than the inner diameter of the pipe, the anchoring device comprising:  
5 a mandrel having an outer surface, an upper end and a lower end, the mandrel sized to move through the pipe in which it is to be used; a radially resilient anchor carriage mounted about the mandrel, the anchor carriage defining an inner surface and a substantially cylindrical outer surface, the anchor carriage having a length selected to  
10 be less than the pipe annular recess length and being sized to pass through the pipe when radially compressed and to have an outer diameter when radially expanded greater than the pipe inner diameter and interengaging grooves and elongate protrusions formed on the mandrel outer surface and on the anchor carriage inner surface, the interengaging grooves and elongate protrusions of the anchor carriage and  
15 the mandrel being selected to limit axial movement of the anchor carriage relative to the mandrel and to permit the anchor carriage to be compressed against the mandrel to fit inside the inner diameter of the pipe and to remain interengaged when the anchor carriage is expanded and latched into the annular recess of the pipe.
- 20 2. The anchoring device of claim 1 wherein the mandrel grooves and elongate protrusions include at least some formed as threads.
3. The anchoring device of claim 1 wherein the mandrel grooves and elongate protrusions include at least some formed axi-symmetric and extending  
25 circumferentially.
4. The anchoring device of claim 1 wherein the anchor carriage is formed as a composite structure having an outer shell of a first material and inner threads formed of drillable material, attached to the outer shell, the inner threads forming the grooves  
30 and elongate protrusions on the inner surface of the anchor carriage.

5. The anchoring device of claim 4 wherein the outer shell thickness is selected not to exceed the depth of the annular recess provided in the casing.
6. The anchoring device of claim 1 wherein the anchor carriage includes a C-ring  
5 portion to provide radial resiliency.
7. The anchoring device of claim 6 where the anchor carriage includes a C-ring at each end and a helically cut spring coil section extending therebetween.
- 10 8. The anchoring device of claim 7 wherein the helically cut spring coil section is configured as a right hand helix.
9. The anchoring device of claim 1 wherein the mandrel includes drillable materials.  
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10. A cement float for use in casing, the casing including an inner diameter with an annular recess formed therein, the annular recess having a length and having a diameter greater than the inner diameter of the casing, the cement float comprising: a mandrel having an outer surface, an upper end, a lower end and an axial bore  
20 extending from its upper end to its lower end, the mandrel sized to move through the casing in which it is to be used; a radially resilient anchor carriage mounted about the mandrel, the anchor carriage defining a substantially cylindrical outer surface and an inner surface, the anchor carriage having a length selected to be less than the casing annular recess length and being sized to pass through the casing when radially  
25 compressed and having an outer diameter when radially expanded greater than the casing inner diameter, interengaging grooves and elongate protrusions on the anchor carriage inner surface and on the mandrel outer surface selected to limit axial movement of the anchor carriage relative to the mandrel and to permit the anchor carriage to be compressed against the mandrel to fit inside the inner diameter of the  
30 casing and to remain interengaged when the anchor carriage is expanded and latched into the annular recess of the casing; a one way valve in mandrel axial bore; and a seal about the mandrel for sealing between the mandrel and the casing.

11. The cement float of claim 10 wherein the mandrel grooves and elongate protrusions include at least some formed as threads.
- 5 12. The cement float of claim 10 wherein the mandrel grooves and elongate protrusions include at least some formed axi-symmetric and extending circumferentially.
- 10 13. The cement float of claim 10 wherein the anchor carriage is formed as a composite structure having an outer shell of a first material and coarse threads formed of drillable material, attached to the outer shell, the coarse threads forming the grooves and elongate protrusions on the inner surface of the anchor carriage.
- 15 14. The cement float of claim 13 wherein the outer shell thickness is selected not to exceed the depth of the annular recess provided in the casing.
15. The cement float claim 10 wherein the anchor carriage includes a C-ring portion to provide radial resiliency.
- 20 16. The cement float of claim 15 where the anchor carriage includes a C-ring at each end and a helically cut spring coil section extending therebetween.
17. The cement float of claim 16 wherein the helically cut spring coil section is configured as a right hand helix.
- 25 18. The cement float of claim 10 wherein the anchor carriage outer diameter, when radially expanded is greater than the annular recess diameter.
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